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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,208	07/01/2003	Geoff Downton	92.1004 CIP	1207

26932 7590 03/18/2005

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EXAMINER
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SMITH, MATTHEW J

ART UNIT	PAPER NUMBER
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3672

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/604,208

Applicant(s)

DOWNTON, GEOFF

Examiner

Matthew J. Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chia et al. (6736221) in view of Ho (4804051) and Weber (4263552).

Chia et al. disclose a method of predicting the operation of a steerable drilling system comprising the steps of: calculating an ideal reachability ellipse, r.sub.I; inputting data representative of actual drilling conditions into a parametric model or matrix; plotting the predicted reachability ellipse 24 and ideal reachability ellipse 26 on a diagram but not calculating predicted build, turn, gain, cross-coupling and bias values to derive build and turn responsiveness values attainable under given operating conditions from the parametric model, comparing the predicted build and turn responsiveness to the ideal response for one or more sets of operating conditions, such as weight on bit, rotational speed, rate of progress, torque, pressure, inclination, dip and azimuth of bedding planes or other formation characteristics, hole curvature/gauge or other geometric conditions, bit type and condition, or errors in instrumentation readings.

Ho presents inputting parametric model data representative of drilling conditions (col. 6 lines 67-68; col. 7 lines 1-19), calculating values in the model (col. 7, lines 32-68; col. 8, lines 1-53) including build and turn (col. 9, lines 30-49), using the model data and

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desired drilling direction data to control drilling (col. 5, lines 13-15), inputting data of desired drilling direction (col. 7, lines 32-68; col. 8, lines 1-14), updating the model (col. 7, lines 20-25), using real time drilling data (col. 6, lines 20-58) such as azimuth, and suggests using all available information to determine the location of the drill bit (col. 8, lines 63-66).

Weber describes the application of gain, bias and cross coupling for determining the location of a device underground.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use build, turn, bias, gain, cross coupling, and real time data to locate an underground structure, such as a bit, as data inputs to find the Chia et al. ellipse r.sub.I since the Ho and Weber parameters provide an accurate location. These parameters would have been well known data used to compare current drilling direction to intended drilling direction.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chia et al. in view of Ho and Weber as applied to claim 1 above, and further in view of Millheim (4794534).

The combination shows a directional drilling system utilizing build and turn values, bias, gain, and cross coupling data to determine an ellipse in order to drill in the desired direction. This combination does not reveal displaying the data.

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Millheim reveals displaying the data, Fig. 6, to provide a drilling engineer with the drilling data (col. 3, lines 6-16).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to display the data generated by the combination, as revealed by Millheim, to provide drilling data to an operator.

***Allowable Subject Matter***

Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Smith whose telephone number is 703-305-5135 or 571-272-7034. The examiner can normally be reached on T-F, 9-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David J. Bagnell can be reached on 703-308-2151 or 571-272-6999. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David Bagnell  
Supervisory Patent Examiner  
Art Unit 3672

MJS *MJS*  
1 March 2005